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BILLITON AUSTRALIA  
MARIONOAK E.L. 22/74, TASMANIA  
REPORT ON GEOLOGICAL MAPPING  
NORTHERN EXTENSION OF BASTYAN DAM GRID

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FIGURE 1. Interpretated Geology - Bastyan Dam Grid Northern Extension. Scale 1:2,000.

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1. SUMMARY

This report details the results of geological mapping and rock sampling carried out on the Bastyan Dam Grid north of Line 800N.

The area straddles the contact zone between sediments of the Cambrian Crimson Creek Formation and Rosebery Group. A small faulted inlier of Precambrian Oonah Formation sediments is caught up in the contact which is apparently a fault zone of major proportions.

There are indications of vein-style mineralization in the Rosebery Group sediments immediately east of the contact. Rock chip and soil sample results confirm that this mineralization is dominantly iron sulphides with minor basemetals, the highest values from the rock sampling being 0.95% Pb and 0.26% Zn. Persistent traces of gold, up to 0.16 g/t, were also detected.

The mapping has shown that the CSAMT anomaly in this northern part of the grid coincides for at least part of its length with the mineralization on the Rosebery Group/Crimson Creek contact.

Overall, it appears that the CSAMT and UTEM anomalies on the Bastyan Dam Grid coincide with the position of the faulted Rosebery Group/Crimson Creek Formation boundary, as mapped by the Tasmanian Geological Survey. This zone of faulting is regarded by the T.G.S. as reflecting one of the largest structures in the State.

It is concluded that the CSAMT and UTEM responses are due to vein-style sulphide mineralization and crushed carbonaceous sediments, within the fault zone. Such mineralization is unlikely to be of economic significance.

It is recommended that the geophysical responses be re-evaluated to determine if they are compatible with this geological picture.

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## 2. INTRODUCTION

Between the 8th and 16th September 1986, five days were spent in the field mapping the northern extension of the Bastyan Dam grid, i.e. from Line 800N to 1800N.

Mapping was hampered by the extremely poor exposure - less than 10 outcrops were noted in almost five kilometres of traversing. Mapping was thus conducted by examination of float, which in these strongly weathered rocks reflects mainly the more-resistant rock types. Under such conditions it is probable that softer rock units such as carbonates would have no surface expression.

A total of 35 selected geochemical rock samples with evidence of possible mineralization were collected from the grid area, while a further five samples were taken from exposures along the north bank of the Pieman River immediately west of the Bastyan Dam.

## 3. GEOLOGY

### 3.1 Stratigraphy & Structure

(See Figure 1 - the Interpretated Geology plan. Descriptions of the various rock units are given in the legend on the plan).

The rocks underlying the northern extension of the Bastyan Dam Grid are Cambrian sediments, some of which are derived from the degradation of basic and felsic volcanics. The sediments along the western part of the grid are strongly weathered and clayey sandstones, siltstones and mudstones/argillites of the Crimson Creek Formation. To the east, the sediments are broadly similar but have features which suggest they are part of the Rosebery Group.

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These features include widespread primary hematitic pigmentation - a characteristic of Rosebery Group rocks but unknown in the Crimson Creek Formation (A.V. Brown pers comm 1986); and the presence of fuchsite within unidentifiable mineralized rocks on the eastern part of the grid at 1600N, 70E. Fuchsite is a ubiquitous component of some units of the Rosebery Group but is unknown in the Crimson Creek Formation (A.V. Brown pers comm 1986). (Fuchsite is present in the Rosebery Group sediments exposed in the roadcut near the collar of drillhole SBD 1, on the southern part of the Bastyan Dam Grid).

On the boundary between the Crimson Creek and Rosebery Group sediments, close to the baseline between lines 1400N and 1800N, there is a 400m x 100m faulted inlier of indurated and weakly metamorphosed sediments of the Precambrian Oonah Formation. These comprise grey to black quartzose, micaceous and partly carbonaceous sandstones, siltstones and shales. They are quite out of context with the surrounding sediments being harder, essentially unweathered and visibly deformed (sufficiently in places to form quartzites and quartz-mica-graphite schists. The Crimson Creek and Rosebery Group sediments are only deformed locally, adjacent to faults).

The area is complexly faulted, with a set of strong east-west faults cut by northerly trending strike faults, which are in turn cut by a NW-SE trending fault extending along the western side of the grid. Bedding strikes north and dips are steep but variable in direction.

The boundary between the Crimson Creek Formation and Rosebery Group in this area is faulted, and the Oonah Formation inlier is evidence that it is a major fault zone, as postulated by Brown (see Fig. 1). Brown considers the Crimson Creek Formation consistently faces west, while the Rosebery Group

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is characterised by tight, small-scale folding with facings both east and west. The exact relationship between the two sedimentary sequences is the subject of debate, but they display fundamental differences in provenance (Brown pers comm 1986).

### 3.2 Mineralization

Generally, indications of mineralization within the gridded area are sparse and weak. The exception is a unit of 'limonitic sediments' immediately east of the Rosebery Group/Crimson Creek Formation contact. Because of the strong weathering, evidence of mineralization now comprises limonite stains, boxworks and veins ( $\pm$  quartz). Minor remnant pyrite was noted in only one locality.

The unit of 'limonitic sediments' comprises argillites, siltstones and sandstones which are oxidised, and partly leached and bleached. They contain stains, patchy boxworks and veins of gossanous limonite, and larger but less common veins of gossanous quartz-limonite up to 80mm wide. Much of the limonite appears to be after sulphides, however samples of the best material show that these must be largely iron-sulphides as maximum values obtained were only 0.37% Pb, 0.26% Zn and 0.07% As. Persistent traces of gold (up to 0.16 g/t) were detected, but copper and silver values were negligible (see Appendix A).

The mineralization appears to be of vein and/or 'sweat-out' style, probably broadly similar to that in the roadcut and intersected in SBD 1, on the southern part of the Basytan Dam Grid. It extends up to 100m east of the Crimson Creek Formation/Rosebery Group contact, and is accompanied by some weak sericitisation, silicification and fuchsite staining of the host sediments.

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It is probable that this mineralization is related to the strong faulting on the Rosebery Group/Crimson Creek Formation contact, as there is evidence elsewhere in this area that the faults associated with this contact are mineralized. The highest basemetal value obtained in the rock sampling was 0.95% Pb from a limonite-quartz gossan floater evidently derived from a strike fault parallel to the trend of the contact but within Crimson Creek sediments. The highest Pb soil value on the grid (550 ppm), occurs at this locality (1800N, 25W).

It should be noted that over most of the grid the soils are unleached and would adequately reflect bedrock metal values. However, the Aberfoyle soil sampling carried out earlier in 1986 confirms the rock sample results by showing soil basemetal values to be very subdued with Pb and Zn values mostly <100 ppm (the maximum Zn value was only 375 ppm).

#### 4. DISCUSSION

The CSAMT conductor which trends through the grid is coincident north of line 1200N with the unit of limonitic (mineralized) sediments and the faulted western contact of the Rosebery Group. Here it is probably reflecting sulphide mineralization and crushed carbonaceous/graphitic rocks (of the Oonah Formation and/or Rosebery Group\*), associated with the zone of faulting.

On line 1200N the conductor coincides with unmineralized Rosebery Group rocks on a high ridge crest immediately east of the limonitic sediments. The strike of the conductor changes here from a north-south trend parallel to the prevailing rock strike, to a NW-SE trend. On the next line to the south (800N), it coincides with a broad swampy alluvial flat almost 100m lower than the ridge on 1200N.

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\*Partly-carbonaceous sediments are a common feature of the Rosebery Group, whereas such rocks are scarce in the Crimson Creek Formation (Brown, pers comm 1986).

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It is difficult to see any consistent local geological origin for the conductor between 1200N and 800N, while the cause north of 1200N is fairly obvious.

Overall, the CSAMT and UTEM anomalies on the Bastyan Dam Grid broadly coincide with the faulted Rosebery Group/Crimson Creek Formation contact as mapped by A.V. Brown of the Tasmanian Geological Survey. Brown considers this to be a steeply-dipping zone of faulting up to 100-200m wide rather than one single fault, and to reflect one of the largest and strongest structures in the State (Brown pers comm 1986). This view is supported by the presence of several faulted inliers of Precambrian Oonah Formation along the fault zone which attest to its fundamental nature. It should be noted that this fault zone is separate from the Marionoak Fault and cuts across it without any apparent offset in either fault.

It seems reasonable to conclude that the CSAMT and UTEM anomalies on the Bastyan Grid are due to vein-style sulphide mineralization and crushed carbonaceous sediments, associated with the zone of faulting on the Rosebery Group/Crimson Creek Formation contact. Such mineralization is unlikely to have significant economic potential.

It is recommended that the geophysicists re-examine the geophysical anomalies in detail to determine if the responses are compatible with this geological picture.



J.G. PURVIS

September, 1986.

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APPENDIX A

GEOCHEMICAL ROCK SAMPLE LEDGER

# SAMPLE RECORD

**METALS DIVISION**

**SAMPLE TYPE:** Rock

**LOCATION / PROJECT:** MARIONDAK EL 22/74  
TASMANIA

**SAMPLER:** J.G. PURVIS

**DATE:** SEPT. 1986

**MAP / PHOTO REF:** \_\_\_\_\_

**ASSAY LAB:** COMLABS

**SAMPLE DESPATCH** 11517, 11518,

**ASSAY REPORT NOS:** COM 861595

**ORDER NO:** 11519

COM 861594

COM 861641

**SAMPLE STORAGE:** DEVONPORT, TASMANIA

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SAMPLE No.	LOCATION	INTER'L (m)	ANALYSES										DESCRIPTION		
			Cu	Pb	Zn	Ag	Au	As							
13098	NORTHERN EXTENSION OF BASTYAN DAM GRID - SEE GEOLOGICAL PLAN	Grab	14	580	175	3	<0.01	24							dk. mica sst and crushed grey shale. Minor py. trace gn.
099		Grab	30	80	80	1	0.02	<2							dk. Black shale & several % dissem. py.
13100		Grab	8	65	145	<1	0.01	105							dk. Black crushed shale + sst & soil % py.
12838		1m chip	5	6	14	<1	<0.01	<2							dk. Intensely silty v. silts, & minor py. sp. gn.
839		Grab	4	6	24	<1	<0.01	7							dk. Strongly silty felsic v. & minor py.
12840		Grab	110	10	100	<1	0.01	18							Float. Leached bleached limonitic sst.
41		Grab	185	20	175	<1	<0.01	7							Float. Siltstone & limonite stains + minor boxworks.
42		Grab	60	<4	145	<1	<0.01	6							Float. Mafic volcanoclastic sst & minor limonite stain.
43		Grab	65	90	480	<1	<0.01	160							Float. Siltstone & limonite bands + stains.
44		Grab	420	12	80	<1	0.02	14							Float. Kappa hematitic sst & 25mm grt - limonite vein.
45		Grab	90	55	230	<1	<0.01	12							Float. Mafic volcanoclastic sst & mod limonite stains.
46		Grab	18	8	46	<1	<0.01	8							Float. Mafic sst & limonite stains + boxworks.
47		Grab	160	6	185	<1	<0.01	6							Float. Schistose sst & lim. boxworks assoc & carb. veins.
48		Grab	110	12	85	<1	0.01	30							Float. Limonite stained weathered shale.
49		Grab	42	10	55	<1	0.01	20							Float. Shale + siltst & veinlets + boxworks of limonite.
12850		Grab	10	<4	14	<1	<0.01	4							Float. 80mm vein grt. & limonite boxworks.
51		Grab	230	4	65	<1	<0.01	14							Float. Leached siltst & strong limonite-gr veins.
52		Grab	90	55	300	<1	<0.01	70							Float. Siltstone & massive limonite.
53		Grab	32	12	140	<1	<0.01	55							Float. Waxy dog-tooth grt - limonite vein.
54		Grab	28	8	350	<1	<0.01	12							Sub dk. Kati-grey argillite & thin grt - lim veinlets.
55		Grab	16	<4	16	<1	<0.01	4							Float. White dog-tooth vein grt.
56		Grab	3	<4	5	<1	<0.01	3							Float. Fractured black chert & thin grt veinlets.
57		Grab	340	4	50	<1	<0.01	20							Float. Schistose siltst & limonite veins + boxworks.
58		Grab	85	30	115	<1	0.04	22							dk. Sheared sediment & limonite stains.
59		Grab	10	6	9	<1	0.16	4							Float. Quartzite, & dark f. or carbonaceous matter.
12860		Grab	20	350	2300	<1	0.02	14							Float. Dogtooth vein grt. & limonite boxworks.
61		Grab	135	1500	2000	<1	0.02	160							Float. Weak grt-sst & lim stains + boxworks.
62		Grab	26	140	210	<1	0.01	22							Float. Highly limonitic vein grt. 30mm thick.
63		Grab	34	330	2250	<1	0.02	290							Float. Unidentified sandy rock & grt - lim veins + schistite.
64		Grab	80	3750	2100	<1	0.02	730							Float. Unident wky siltst rock & mod lim + minor py.
65		Grab	145	48	95	<1	0.01	9							Float. Kati-grey siltst & limonite on facets.
66		Grab	210	9550	780	<1	0.02	115							Float. Gossan! A leached limonite-grt capping.
67		Grab	270	3900	490	<1	0.01	60							Float. Weak sst & limonite + thin stains + boxworks.
12868		Grab	55	8	230	<1	0.02	40							dk. Weak sst & limonite boxworks in veins.

**REMARKS:** Rock samples selected during mapping of northern extension of Bastyan grid. Rocks are from Crinoid Creek Formation and possible Kookerby Group sediments. Samples 13098-12839 are from exposures behind Rosebery Thrust near Bastyan Dam: 13098 - 215m west of Rosebery Thrust (R); 13099 - 80m west of R.T.; 13100 - 25m west of R.T.; 12838 - 0-1m east of R.T.; 12839 - 18m east of R.T.



375 000mE

375 500mE

# LEGEND

## CRIMSON CREEK FORMATION (EOCAMBRIAN-CAMBRIAN)

Interbedded khaki-grey to pale green SANDSTONE (st), SILTSTONE (sl) and MUDSTONE (md) with lesser ARGILLITE (arg). Characteristically strongly weathered, soft, clayey and poorly exposed. Generally lithic with minor quartz, mica or feldspar. Occasional purple weakly hematitic beds.

## ROSEBERY GROUP (EOCAMBRIAN-CAMBRIAN)

Limonitic sediments - SANDSTONE (st), SILTSTONE (sl) and ARGILLITE (arg) / MUDSTONE (md). Strongly oxidised to yellow-brown clays. Poor exposure. Characterised by limonite stains and limonite veins & quartz, apparently at least partly after disseminated and vein sulphides. Weak sericitisation in places. Minor fuchsite stains noted in this unit on Line 1600N.

Massive SANDSTONE (st) and SILTSTONE (sl), with interbedded ARGILLITE (arg) / MUDSTONE (md). Characteristic purple colour due to minor hematite, or (less) green colouration where volcanoclastic and of basic volcanic derivation. Commonly quartzose and micaceous, or lithic and felsic (probably largely volcanoclastic). Some mudstones of greyish chocolate type.

## OONAH FORMATION (PRECAMBRIAN)

Grey to black quartzose, micaceous and slightly carbonaceous or graphitic SANDSTONE (st), SILTSTONE (sl) and SHALE (sh). Hard and weathered, moderately deformed - sufficient to form QUARTZITE (qtz) and SCHIST (sch) in places. Minor black CHERT (ch) on Line 1600N.

### SYMBOLS

	BEDDING	br	BROWN
	SCHISTOSITY	yel	YELLOW
	FACINGS	gr	GREEN
	ROCK SAMPLE LOCATION (ALL NUMBERS PREFIXED 12...)	pur	PURPLE (HEMATITIC PIGMENTATION)
	INTERPRETED GEOLOGICAL CONTACT	kh	KHAKI
	INTERPRETED FAULT	gy	GREY
	AREAS OF OUTCROP (MAPPED BY J.G.P.)	bl	BLACK
	AREAS OF FLOAT & SUBOUTCROP (MAPPED BY J.G.P.)	ox	OXIDISED
		le	LEACHED
		ble	BLEACHED
		vol	VOLCANICLASTIC
		li	LIMONITE / LIMONITIC
		silif	SILIFICATION
		frac	FRACTURES
		mica	MICACEOUS
		qtz	QUARTZ / QUARTZOSE
		graph	GRAPHITIC / CARBONACEOUS
		ser	SERICITIC

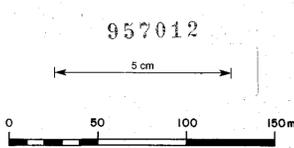
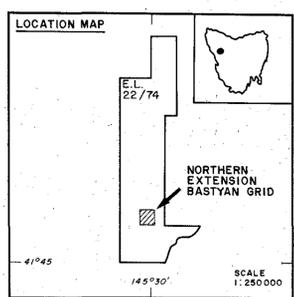
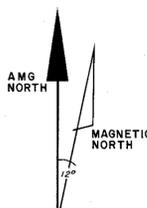
### ABBREVIATIONS

5380 000mN

5379 500mN

5379 000mN

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<b>Billiton Australia</b> The Metals Division of the Shell Company of Australia Limited			
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